

Validation of an Apnea Risk Evaluation Questionnaire

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Rationale:

Obstructive Sleep Apnea (OSA), a prevalent, underdiagnosed disorder, can cause drowsiness, memory impairment, and increased risk of cardiovascular disease, stroke, hypertension, and diabetes. There is a need for convenient, inexpensive screening methods for OSA.

The Apnea Risk Evaluation System Questionnaire (ARES Q) assesses OSA risk factors, including body mass index, neck size, self-reported drowsiness, snoring, and observed apneas. The ARES Q analysis uses discriminant function analysis to classify OSA risk. Validation of the ARES Q and its relationship to objective measures of daytime drowsiness and memory are reported.

The ARES Q can be administered via pen and paper, a laptop computer, a palm pilot, or the internet.

Methods:

1) Medical histories, in-home and/or in-lab (PSG) sleep studies were conducted for 184 healthy subjects, 230 patients referred to a sleep lab, and 55 patients with hypertension or cardiovascular disease but with no history of OSA. The general medical patient's PSG results revealed 82% with an RDI > 10 and 93% with an RDI \geq 5. The ARES Q analysis was used to classify individuals as At-Risk or No-Risk.

2) A subset of 47 healthy subjects and 156 OSA patients completed vigilance and memory tests to assess cognitive impairment. Vigilance accuracy (VigAcc), reaction times (VigRT), lapses, memory accuracy (MemAcc) and minutes awake on a 40-minute modified Maintenance of Wakefulness Test (MWT min awake) were computed.

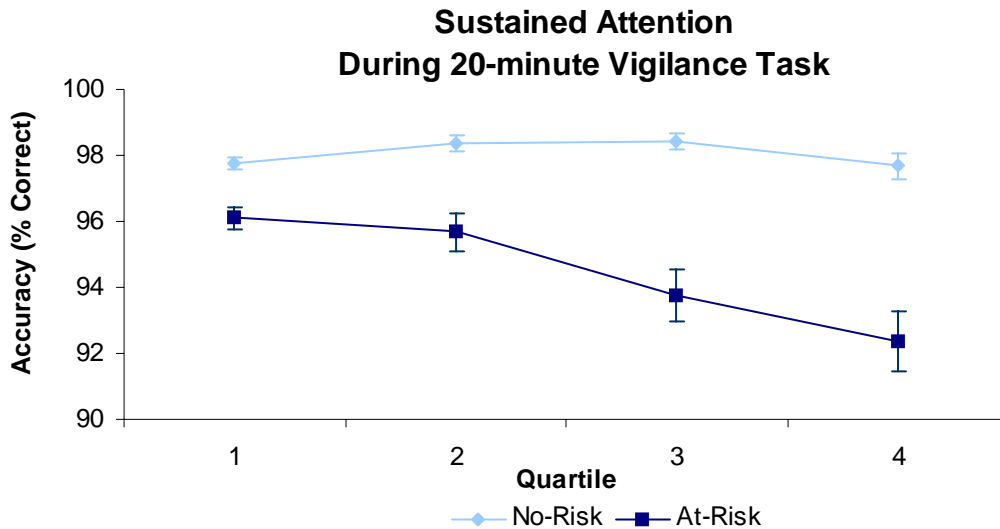
Results:

Based on the Apnea-Hypopnea Index (AHI), the sensitivity and specificity of the ARES Q was calculated.

ARES Questionnaire Statistics		
AHI Cut-off	Sensitivity	Specificity
≥ 5	95.4% (267/280)	75.1% (142/189)
> 10	97.5% (230/236)	79% (149/233)

The At-Risk group showed significantly ($p < .001$) impaired vigilance and memory accuracy, slower reaction times, and decreased ability to sustain attention in a vigilance task.

Mean Performance for ARES Q No-Risk and At-Risk Groups					
ARES Q	VigAcc	VigRT	Lapses	MemAcc	MWT min awake
No-Risk (n=47)	98.0	0.638	0.57	97.8	40.0
At-Risk (n=156)	94.9	0.725	2.34	85.5	35.3



Conclusions:

ARES Q provides a simple, affordable screen for risk of OSA. Patients identified as At-Risk by the ARES Q evidenced significant memory impairments and increases in daytime drowsiness as measured by performance.

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